

**WALL PANEL USES LOCAL MATERIAL AND WASTE AS THE
SOLUTION OF BUILDING MATERIAL IN THE EARTHQUAKE
ZONE**

Final Project

Submitted as partial for Filling
The Requirement for Bachelor degree of Civil Engineering



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UNIVERSITY MUHAMMADIYAH OF SURAKARTA
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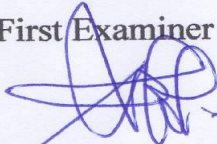
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Surakarta, 09th of August 2017



Wahyu Rio Adie

PREFACE

Assalaamu'alaikum Wr Wb.

Alhamdulillah, all praise of gratitude is praised to the presence of Allah S.W.T over the abundance of grace, taufik and hidayah allah so that the preparation of the Final Project can be completed. This Final Project is prepared to complete the requirements to complete the S1 degree program at the Engineering Faculty Civil Engineering Department University Muhammadiyah of Surakarta. With this the authors would like to thank all those who have provided support so that the authors can complete this Final Project.

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Author realized that there is no perfect thing, therefore critics and constructive suggestions for the perfection extremely authors expect at this final and hopefully, this final can be useful for us. Amin.

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Surakarta, July 2017

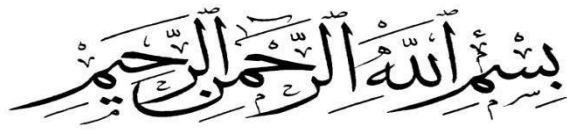
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Motto

- ✓ And seek help through patience and prayer, and indeed, it is difficult except for the humbly submissive (to Allah).
(Q.S. Al Baqarah : 45)
- ✓ “Indeed, with hardship (will be) ease. So when you have finished (your duties), then stand up (for workship) and to your lord direct (your) longing”.
(Q.S. Al Insyirah : 6 –8)
- ✓ “Education is the best equipment for old age”
(Aristoteles)
- ✓ “Allah will exalt those who believe among you and those who are given some degree of knowledge”.
(Q.S. Al-Mujadila : 11)
- ✓ “Humans are best beneficial to humans”.
(HR.Ahmad, ath-thabrani)
- ✓ “Whoever eases the difficulties of a mu'min from the difficulties of the world, Allah will ease his difficulties on the end day. And who makes it easy for the man who is in necessary trouble Allah will make it easy for him in this world and the hereafter”.
(HR. Muslim)
- ✓ “Allah does not burden a person but according to the level of his ability.”
(Q.S. Al-Baqarah : 286)
- ✓ “Sufficient is Allah to me, there is none other than Allah, Only to Allah I put my trust”.
(Q.S. At-Taubah : 129)

DEDICATION



- Allah SWT who has given guidance and always protect, give me health, so that I can finish this final project smoothly.
- Beloved Father and Mother, thank you for your prayers and support. May Allah reward you better than what you have given me.
- Beloved sister, thank you for prayer and support.
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GLOSSARY OF SYMBOLS AND NOTATIONS

A	= The surface of sample (mm^2)
b	= Width of sample (mm)
f'_c	= Compressive stress (N/mm^2)
h	= High of sample (mm)
L	= Length of Sample (mm)
P_{maks}	= Load Maximum (N)
V	= Volume of sample (cm^3)
W	= Weight of sample (gram)
γ_c	= Specific gravity (gram/cm^3)
σ	= Pull strength of bamboo (N/mm^2)
π	= Phi.

WALL PANEL USES LOCAL MATERIAL AND WASTE AS THE SOLUTION OF BUILDING MATERIAL IN THE EARTHQUAKE ZONE

ABSTRACT

Indonesia is prone to earthquakes because passed by the meeting of three lines of tectonic plates, namely the Indo-Australian Plate, the Eurasian plate and the Pacific plate. Application of concrete panel wall using lightweight materials obtained in quake zone expected to be a solution cracks usually occur. One earthquake area that is klaten and surrounding there are many natural resources. Therefore, required use of local materials and waste. Such as pumice, bamboo and fly ash. This research is expected to produce a lightweight concrete with good strength earthquake resistance. This research aims to maximize the functionality / usability local material and waste as an alternative to reduce the rift wall panel to get strength earthquake resistant all at once essentially has economic value and in aspect of quantity and quality will also optimize the use of existing natural resource. Furthermore, the results of this research will be recommended to be the solution to the wall panels on homes in areas prone to earthquake.

Key Word : Earthquake, Wall panel, Pumice, Fly ash, Waste, Bamboo.

ABSTRAKSI

Indonesia merupakan daerah rawan gempa bumi karena dilalui oleh jalur pertemuan 3 lempeng tektonik, yaitu Lempeng Indo-Australia, lempeng Eurasia, dan lempeng Pasifik. Penerapan dinding panel beton bermaterial ringan yang didapat di wilayah gempa diharapkan dapat menjadi solusi keretakan yang biasanya terjadi. Salah satu wilayah gempa yaitu klaten dan sekitarnya banyak terdapat sumber daya alam. Oleh karena itu, dibutuhkan pemanfaatan material lokal dan limbah. Seperti batu apung, bambu dan abu terbang (*fly ash*). Penelitian ini diharapkan mampu menghasilkan suatu beton ringan dengan kekuatan tahan gempa yang baik. Penelitian ini bertujuan untuk memaksimalkan fungsi/kegunaan material lokal dan limbah sebagai alternatif mengurangi keretakan dinding panel untuk mendapatkan kekuatan tahan gempa sekaligus pada hakekatnya mempunyai nilai ekonomis dan segi kuantitas maupun kualitas juga akan mengoptimalkan penggunaan sumber daya alam yang ada. Selanjutnya, hasil penelitian ini akan dapat direkomendasikan untuk menjadi solusi pada dinding panel pada rumah di wilayah yang rawan terhadap gempa bumi.

Kata Kunci : Gempa bumi, Dinding panel, Batu apung, Abu terbang, Limbah, Bambu
